LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.*]

The Eclipse Photographs

IN his letter published in NATURE on the 1st of June, and to which Mr. Brothers courteously replies in your issue of the 15th, the writer briefly touched upon four different points bearing on the value of the eclipse photographs. Those points are:—1st, The possibility in a comparatively cloudless sky of a luminosity akin to that represented under the name of the corona on page 370 of the number of NATURE issued on March 9, but caused only by moisture in our atmosphere, as illustrated by his instance of what he termed a lunar halo; 2ndly, The presence of a luminosity on what he apprehends should have been the dark disc of the moon, as represented in the photograph of the American observers at Cadiz; 3rdly, The indifferent definition of the published photograph; and 4thly, The evidence as presented by the photograph of the identity of the coronal rifts. Referring to the first of these points, Mr. Brothers "fails altogether to see the connection between the solar corona and a lunar halo." If the term halo, as applied to any appearance pertaining to the moon, is confined to the ring of light so frequently to be observed apparently surrounding the lunar disc, the writer would substitute the word "luminosity" for halo. The appearance he alluded to resembles Mr. Brothers's woodcuts of the corona already mentioned, more than anything else to which he can compare it, and in common phraseology may be described as a patch of light surrounding the apparent position of the moon, extending from it to a distance varying from about one degree to two or two and a-half, and having an irregular or rifted outline. The phenomenon in question was observed by the writer when the atmosphere was in such a condition that no trace of cloud whatever was visible for a distance round the moon of some thirty or forty degrees. He mentions this merely to show that even when no visible condensation of moisture is present, an appearance—attributable to nothing but atmospheric moisture, and analogous to what is termed the solar corona—is not to be regarded as out of the common, and nothing to be wondered at. Touching the second point, Mr. Brothers would seem to be of opinion that a solar corona may be seen even when the dark disc of the moon intervenes between it and the observer's eye; for he says of the luminosity in question that if caused by our atmosphere it would extend all round and all over that disc. The point at issue here is a very simple optical question, in the discussion of which space would be merely wasted, and in reference to which the writer would simply reiterate the opinion he has already expressed, that the luminous appearance as seen extending on to the disc of the moon in the Cadiz photograph, is (if it were visible outside the camera) attributable to nothing but the influence of the terrestrial, or of a lunar atmosphere. Whilst speaking of the American observer's picture, he would remark in answer to two observations by Mr. Brothers, first, that he is not in "possession of exclusive information" concerning the circumstances of its production; and secondly, that he does not assume that it was taken under conditions less favourable than those prevailing at Syracuse. He does, however, assume that that photograph either represents only the phenomenon to which the instrument used in its production was directed, or that it represents something in addition to that phenomenon. If its representation is confined to the phenomenon, then upon the grounds already shown, he considers that what is called the coronal light in the Cadiz picture not only may be, but most certainly is, in part at any rate, merely the result of atmospheric moisture. If, however, the American observers were unfortunate enough to represent in their photograph a luminosity not belonging to the eclipse at all, then he considers that what did belong to the eclipse is not distinguishable in their picture from what did not. In short, whether the Cadiz picture does or does not represent only what it should do, the writer is of opinion that any evidence it can afford respecting the identity of the coronal rifts must be other than *satisfactorily* conclusive.

Concerning the third point, namely the "indifferent definition," to which he directed attention, Mr. Brothers admits the validity of his remarks, so far as Syracuse picture No. 5 is concerned; and this picture, it may be observed, Mr. Brothers would seem to consider the best of his series, inasmuch as it is the only one procurable of the opticians in Manchester, and also is the one selected for an engraved representation in the pages of NATURE.

Respecting the last of the four points on which the writer has taken the liberty to remark, viz. the evidence afforded by the photographs of identity in the coronal rifts as seen at Cadiz and Syracuse, he is of opinion that he has already said sufficient to justify his observation that that evidence is not "satisfactorily conclusive." If, however, Mr. Brothers should entertain a different opinion, and the Editor of NATURE think the matter worthy of further space, he will make a few other remarks, looking at the subject from an altogether different point of view.

In conclusion, the reader should be reminded that the subject under discussion is not the astronomical question—Is the sun surrounded by a medium which is illuminated by his rays and rendered visible under favourable circumstances to the eye of a terrestrial observer? but, assuming this to be the case—Is the luminosity indicated in the photographs under consideration a representation of that medium or is it not?

The writer does not doubt the existence of such a medium round the body of our great luminary (though, assuming it, ought there not to be some trace of it visible above the western horizon, immediately after sunset in a dry climate?), but he does doubt whether the patch of light depicted in the photographs of the late solar eclipse is in the main other than a phenomenon of terrestrial meteorology. D. WINSTANLEY

The Solar Parallax

MR. PROCTOR entirely misunderstands me if he thinks that my criticism on his account of the solar parallax had reference to any failure on his part to give prominence to the discussion between Mr. Stone and myself, or to correctly apprehend that discussion. To point out all the imperfections and inaccuracies in his account would take a whole column of NATURE, and I have neither the time nor the disposition to make such a display of the accidental errors of a fellow-worker in the astronomical field. But, if Mr. Proctor desires it, I will constitute him judge in his own case in form and manner as follows: I will send him privately the list of specifications on which my criticism was founded. If, in his opinion, this list fails completely to sustain the proposition that his history of recent researches on the solar parallax is "imperfect and inaccurate in a remarkable degree," he is to publish it with any defence he chooses to make. Otherwise he may keep it for his own private use in case he brings out a second edition of his work. The kind spirit in which he has taken my remarks is highly appreciated, and I shall be happy to hear from him privately on the subject. SIMON NEWCOMB

Halo in the Zenith

AT 20 minutes to 6 P.M. on Saturday 10th inst., I witnessed a natural phenomenon which I understand is very unusual. It was a portion of a halo around the zenith. Take the zenith as centre, and with a radius of 20° describe an arc of 120° parallel to the horizon, and having 60° on each side of due west. This gives the position in the heavens, as nearly as I could determine, using no other means of observation except my eyes. The convex surface was red, concave blue. Other colours were also apparent, and were very distinct towards the centre of the arc of 120°, becoming much diluted at a greater distance. The horns of the arc gradually faded away amid the cirri with which the whole sky was covered, its blue colour being only partially obscured. You could tell at a glance that the zenith was the centre of the halo. The phenomenon only continued five minutes from the time I first saw it, until it disappeared altogether. It has been suggested to me that probably the azimuth of the sun and that of the centre of arc of 120° coincided. I think this is very likely, but I did not note it particularly at the time. The wind was easterly, and the sun shone brightly where I was standing. If any of your numerous correspondents would favour me with an explanation of the above I would be greatly obliged. No other halo or portion of a halo was visible at the time.

R. M. BARRINGTON

Fassaroe, Bray, Co. Wicklow, June 26

What is Yellow Rain?

THE letter of Mr. A. Ernst in NATURE, May 25, on a recent case of "yellow rain," possesses considerable interest to all who have paid any attention to early prodigies; because his deter-

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mination of the nature of that phenomenon, if true, serves to confirm the statements of others who have observed similar occurrences. The confirmation, however, only extends so far, as proving that, a yellowish substance has been seen on bodies after a fall of rain. I can mention instances where sudden appearances have taken place, and would be called *yellow* rain, without the aid of ordinary rain.

The earliest case I am acquainted with occurs in Pliny,[*] who says:—

"In like manner it rained iron in Lucania, the year before that in which M. Crassus was slain by the Parthians; and together with him all the Lucani, his soldiers, of whom there were many in his army. That which came down in the rain resembled in some sort sponges; and the aruspices gave warning to take heed of wounds from above."

This records two kinds of showers, viz., iron and sponges, but they were, I believe, one shower, although I have never seen any explanation of this curious passage. An account of a few "preternatural showers," I have lately come across, seems to contain exactly the information I have been seeking to clear up this difficulty. As it is novel, and was written in apparent ignorance of Pliny's record, it has at the present time some value. It says, in attempting to explain the cause of "red snow":—

"This singular phenomenon, which has been observed in the Arctic regions, seems to be owing to the presence of oxide of iron in a state of minute division, and also of a resinous vegetable principle of an orange-red colour, belonging apparently to some lichen, of which too, perhaps, the iron may form one of the immediate principles."[†]

This explains Pliny to a certain extent; in the common ignorance of both ascribing the redness of the snow to iron rust, or oxide of iron, and the matter that remained after the dissolution appearing of a sponge-like texture, and called a sponge or sponges by Pliny, and a resinous vegetable principle of an orange-red colour by Phillips.

This I think is the most probable meaning, and is, perhaps, the earliest "yellow" shower on record. The colour, as stated by the latter, is nearly correct, as shown by the investigation of MM. De Candolle and Prevost, who discovered, microscopically, that the red snow was due to the presence of small globules of a bright red colour, which were surrounded by a gelatinous membrane, transparent and slightly yellow, and were mixed with fragments of moss and dust. "An examination of the crimson snow found by Captain Ross in the Arctic regions by M. De Candolle proved it to be identical with the Alpine red snow; the globular bodies are of a vegetable nature, and were once thought to belong to the *Uredo*, but M. Bauer disproved this, and named the plant *Protococcus nivalis*. There are cases, however, in which the presence of animalcules gives a reddish tinge to snow."[‡]

Honeydew is mentioned by Pliny (Bk. XVIII. c. 28), who states that a great many of the ancients affirmed that dew burnt up by the scorching sun is the cause of honeydew on corn.

In the *Chronicum Scotorum* is the earliest direct record of a "shower of honey" I know of.[§] It says: "A.D. 714 . . . . it rained a shower of honey upon Othan Bec. . . . ."

When it is known that any sudden appearance, giving a colour to the ground, or prominent places, or on trees, &c., is generally thought to have descended from above, this passage is quite intelligible. The "shower of honey" was nothing more than a "secretion of *aphides*," whose excrement has the privilege of emulating the sugar and honey in sweetness and purity."[||] Some contend that it is due solely to the exudation of the saccharine juices of trees; but, feasible as this may seem, it is not sufficient to account for this phenomenon, which often extends over very large tracts of land. If the exudation is promoted by the aphides, and the dew increased by their own excrement, then this explanation is, I believe, the true one. The former view is not to be discarded without some consideration; for one observer states that, in the course of thirty years he had attended to this subject, he had never met with any honeydew which did not seem to him to be clearly referable to aphides as its origin.[¶] This view does not go counter to what I conceive to be the correct one; for exudations do take place, and the quantity of "dew" can be increased by the aphides.

There is a very curious account given in a now little known work of what was considered the real cause of "honeydew," but I will not trespass further upon the valuable space of this journal in quoting it. I give the title at foot.[*]

More can be said upon this interesting subject; and on another occasion I hope to resume the investigation, by attempting to explain the "yellow rains" of a different kind to those treated of in this letter.

JOHN JEREMIAH

43, Red Lion Street

Black Rain

THE following notice of a shower of black rain, which has been sent to me by my friend Mr. G. J. A. Walker, of Norton Villa, near Worcester, though not so exact in its description as I could have wished, may call attention to the subject, and elicit a more detailed account, if in this ungenial season rain of a similar nature has fallen elsewhere. Mr. Walker's residence is about three miles south-east of Worcester, and he says, that after three or four hours of common rain on Tuesday June 6, it became suddenly dark about seven o'clock, P.M., and shortly after a rain like ink poured down for a quarter of an hour, after which light returned upon the scene. The following morning the sheep at Woodhall (an adjacent farm) appeared as if their fleeces had been dyed black; also the dog and a grey pony that Mr. Walker had out in a field close by appeared as if they had been rolling in soot or in a coal hole. The black matter brought down with the rain was of an adhesive nature, and at Littleworth, within a mile of Norton, where this rain fell into some tubs, it was observed to be as black as ink. This black rain was particularly remarked, as clear ordinary rain had been falling for some hours on the day mentioned, but had ceased an hour previously to the commencement of this black downfall. The actual rain of that evening did not extend to Worcester, but I have a note taken at my residence here at the time, that "the gloom was singular and overpowering all the evening." I regret that, going into Herefordshire the next day, I was not aware of this occurrence till some days after, and none of the black rain or the adhesive matter it brought down had been preserved for microscopical examination.

EDWIN LEES

A New View of Darwinism

I HAVE noticed that NATURE is very catholic in its sympathies, and allows all views which are not palpably absurd to be discussed in its pages, and I therefore venture to ask for some space in which to present a few of the difficulties which have been suggested by Mr. Darwin's theory of Natural Selection, and which have not, so far as I know, been as yet discussed. I have not the taste for the language nor the arguments which were used by a *Times* reviewer, and I have much too great a reverence for one of the most fearless, original, and accurate investigators of modern times, to speak of Mr. Darwin and his theory in the terms used by that very ignorant person. Approaching the subject in this spirit, and knowing how very small a section of biologists are now opposed to Mr. Darwin, I may be very rash, but hardly impertinent, in stating my difficulties.

I cannot dispute the validity and completeness of many of Mr. Darwin's proofs to account for individual cases of variation and isolated changes of form. Within the limits of these proofs it is impossible to deny his position. But when he leaves these individual and often highly artificial cases, and deduces a general law from them, it is quite competent for me to quote examples of a much wider and more general occurrence that tell the other way. In this communication I shall confine myself to Mr. Darwin's theory, and shall not trepass upon the doctrine of evolution, with which it is not to be confounded.

The theory of Natural Selection has been expressively epitomised as "the Persistence of the Stronger," "the Survival of the Stronger." Sexual selection, which Mr. Darwin adduces in his last work as the cause of many ornamental and other appendages whose use in the struggle for existence is not very obvious, is only a by-path of the main conclusion. Unless by the theory of the struggle for existence is meant the purely identical expression that those forms of life survive which are best adapted to survive, I take it that it means in five words the Persistence of the Stronger.

Among the questions which stand at the very threshold of the

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[*] Bk. II. c. lvi.

[†] Lectures on Natural Philosophy, 1st series, by Montagu Lyon Phillips. London, 1839, pp. 47-48.

[‡] Vegetable Physiology, by Dr. W. B. Carpenter, 1858, p. 580.

[§] This I take to be equivalent to "honeydew."

[||] Kirby and Spence's "Entomology," 1867, p. 119.

[¶] Kirby and Spence, foot-note, p. 119.

[*] Rohault's "System of Nat. Phil.," by John Clarke, D.D., vol. ii. p. 217. London, 1723.

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